

A new species of land planarian (Platyhelminthes: Tricladida: Terricola: Rhynchodemidae) from South Africa, with a list of African terrestrial planarian species

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Othelosoma joburgi is described from Roodepoort, Gauteng province, South Africa. Preserved worms are up to 16 mm long and 3 mm wide, cylindrical, plump, and 'sick green' in colour with no obvious stripes or markings. There is a dorsal anterior retractor muscle which causes the head to be strongly retracted, and strong parenchymal longitudinal musculature. The penis has a distinct conical papilla. There is a large copulatory bursa with both a ductus vaginalis opening directly to the exterior and a Beauchamp's canal connecting to the common ovovitelline duct. A list of all African land planarian species with brief descriptions and locations is included in the hope of encouraging further records.

Key words: *Othelosoma joburgi* n.sp., flatworm morphology, distribution.

INTRODUCTION

The African land planarian fauna has been summarized by Marcus (1955a,b) and Jones (1998). All native African species are of the family Rhynchodemidae (possessing a single pair of eyes), though species of other families have been introduced. In 1993, specimens of preserved (in alcohol) land planarians were sent to me by A. Le Roy, Roodepoort, South Africa. They had been found under bricks and plastic flower bags on a south-facing paved washing area. There were 'ordinary and much more common black ones and rather fatter sick-green ones'. The black ones have multiple eyes (family Geoplanidae) and proved to be an introduced species, *Kontikia ventrolineata* (Dendy, 1892) (see Jones *et al.* 1998). The more plump, green ones are the subject of this paper. They have a single pair of eyes, thus are rhynchodemids, but appear not to have been previously described. They are thus described as a new species.

Land planarians are markedly under-recorded in Africa. A list of African land planarian species, including brief descriptions (updated from that of Jones 1998), is included in the hope that this will encourage further records and sightings.

METHODS

The whole preserved specimens were examined intact and after clearing in cedarwood oil. Sketches were made using the drawing tube on a stereo

microscope. A medium-sized specimen (which was mature) was selected as the holotype and divided into anterior and posterior (including the pharynx) portions, wax embedded, sectioned at 10 μ m, stained in haematoxylin and eosin and mounted in Canada balsam. Drawings were traced using a camera lucida.

TAXONOMY

Order Terricola Hallez, 1890

Family Rhynchodemidae Graff, 1896

Subfamily Microplaninae Pantin, 1953

Genus *Othelosoma* Gray, 1869

Rounded, elongated body, anterior may be blunt or inrolled. Narrow creeping sole reaches nearly to the anterior tip. Very large seminal bursa which communicates by two openings (or by a common opening with two canals), a ductus vaginalis and a Beauchamp's canal, leading into the genital atrium. Dorsal anterior parenchymal musculature is very highly developed and may be differentiated as a discrete retractor muscle. (This definition is taken from Ogren & Kawakatsu 1988, after Pantin, 1953.)

***Othelosoma joburgi* n.sp.**, Figs 1–3

Material examined. Holotype. Preserved length about 10.6 mm, width 2.5 mm, height 2 mm. Pharyngeal aperture (mouth) and gonopore are respectively 6 mm and 8 mm from the anterior

end. Divided into two parts: anterior serially sectioned transversely; posterior, including pharynx and copulatory apparatus, serially sectioned longitudinally. Eighteen slides with both transverse and longitudinal sections. Deposited in the Transvaal Museum, Pretoria, accession number TM 21815 a–r.

Paratypes. Two preserved specimens. One about 6 mm long, 1.3 mm wide and 1 mm high; pharyngeal aperture 3.2 mm behind anterior end; immature. The other about 15.4 mm long, 2.9 mm wide and 2.4 mm high; pharyngeal aperture and gonopore are respectively 8 mm and 10.5 mm from the anterior end. Deposited as above, accession numbers TM 21816/7.

Type locality. Roodepoort, South Africa.

Etymology. After Jo'burg, the colloquial abbreviation of greater Johannesburg that includes Roodepoort.

Diagnosis. *Othelosoma* of uniform 'sick-green' colour; anterior dorsal retractor muscle, partly in a cavity; annular zone of parenchymal longitudinal and circular muscle; female copulatory apparatus has a large bursa, a convoluted 'Beauchamp's canal' which joins the common ovovitelline duct close to the common antrum and a ductus vaginalis which leaves the bursa posterior to the Beauchamp's canal and opens just inside the gonopore.

Description. Apart from the original note about the 'sick-green' colour, there are no observations on living specimens.

The preserved specimens are strongly contracted longitudinally. They are curved ventrally, there is a small depression on the anterior tip and the body has numerous fine circular creases (Fig. 1), presumably the result of contraction. They are roughly cylindrical, though width is slightly greater than height. They are almost uniformly white and there are no external markings. After clearing, two eyes are visible as black spots very close to the anterior end, very close together and insunk by contraction of the anterior end (Fig. 1). There is a narrow ventral creeping sole, about one third the width of the animal. The pharyngeal aperture (mouth) is just over half-way along the ventral surface and the gonopore of the two mature specimens is two thirds and three quarters along the ventral surface respectively.

The eyes face forwards and are quite large but very close together, about $140\ \mu\text{m}$ apart (Figs 1, 2a,b). The anterior of each eye consists of a hyaline 'lens' anteriorly, about $60\ \mu\text{m}$ wide, and narrows to

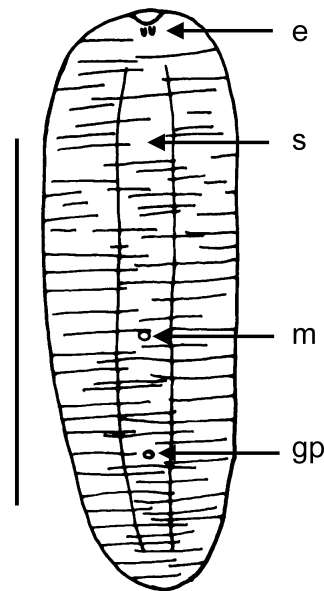


Fig. 1. *Othelosoma joburgi*. Ventral view of type specimen after clearing. Key: e = eyes (with depression anteriorly due to muscle contraction); gp = gonopore; m = mouth (pharyngeal aperture); s = ciliated creeping sole. Scale bar = 5 mm.

a posterior pigmented retinal cup. Each eye occupies about $12, 10\ \mu\text{m}$ sections and thus is about $120\ \mu\text{m}$ long. The hyaline region is about $70\ \mu\text{m}$ long and the pigmented cup about $50\ \mu\text{m}$ long.

There is a well-differentiated dorsal longitudinal retractor muscle which inserts immediately posterior to the eyes. It is about $200\ \mu\text{m}$ in diameter and appears to be positioned in a surrounding cavity for some of its length (Fig. 2c). It originates some distance posteriorly (about 133 sections from the anterior tip, thus about 1.33 mm), the longitudinal fibres dispersing above the central gut diverticulum (Fig. 2d). There seem to be no muscle fibres immediately sub-epidermal. If there are any they are extremely thin. There is a well-defined, annular region of parenchymal longitudinal and circular muscle fibres some distance in from the epithelium (Fig. 2a–e). The only other muscle fibres of note are a group of transverse fibres dorsal to the ventral nerve cords (Fig. 2c–e).

The anterior nervous system is unpaired and lies ventral to the eyes (Fig. 2a–b). A short way posteriorly, it separates and forms the paired ventral nerve cords (Fig. 2c–e). Away from the very anterior tip, there appears to be a neural plexus above the ventral creeping sole (Fig. 2e).

The anterior extremity of the gut is just posterior

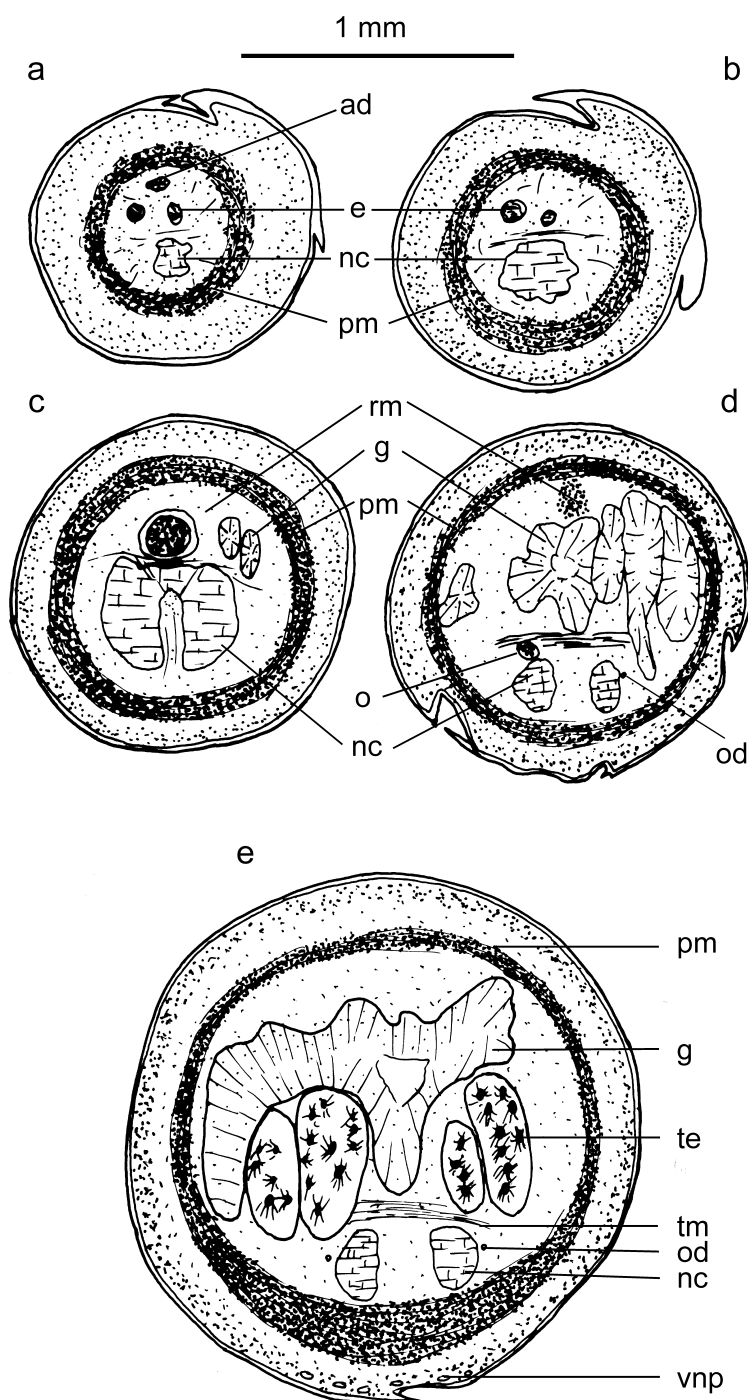


Fig. 2. *Othelosoma joburgi*. Transverse sections of the anterior portion. **a**, Very near the anterior end, showing the pair of eyes and the end of the anterior depression; **b**, through the pair of eyes; **c**, behind the eyes and through the dorsal retractor muscle and anterior diverticula of the gut; **d**, through the posterior origin of the retractor muscle, the ovary on one side and oviduct on the other; **e**, through the mid-region of the body showing the multiple testes. Key: ad = anterior depression; e = eye; g = gut; nc = nerve cords; o = ovary; od = ovovitelline duct; pm = ringzone of parenchymal longitudinal and circular muscle; rm = retractor muscle; te = testes; tm = transverse muscle; vnp = ventral nerve plexus.

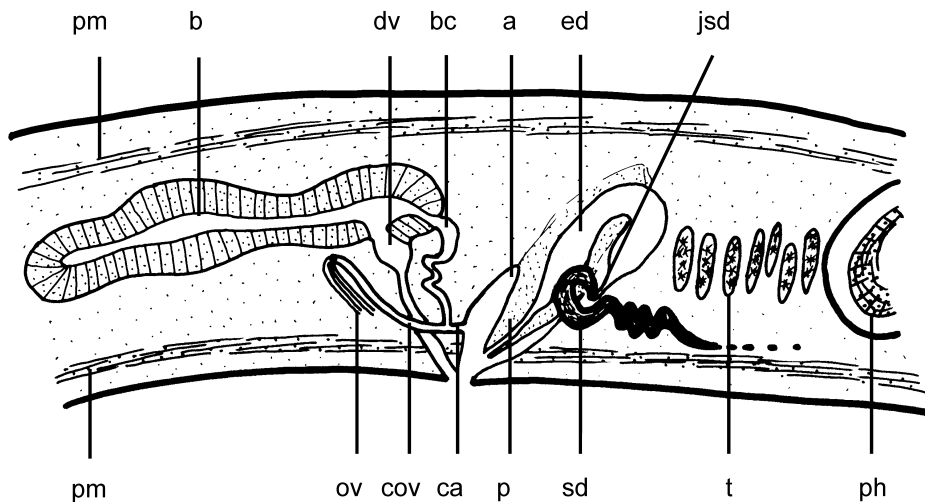


Fig. 3. *Othelosoma joburgi*. Composite, semi-diagrammatic, longitudinal section through the copulatory apparatus. Key: a = common antrum; b = bursa; bc = Beauchamp's canal; ca = canalis anonymus; cov = common ovovitelline duct; dv = ductus vaginalis; ed = ejaculatory duct; jsd = junction of the sperm ducts; ov = oviducts; p = penis; ph = pharynx; pm = ringzone of parenchymal muscle; sd = sperm duct; te = testis.

to the eyes. The gut is typically triclad, with a single anterior diverticulum with numerous lateral branches and two posterior diverticula each with numerous lateral branches. The diverticula are inside the annular zone of parenchymal musculature.

There is a single pair of small ovaries which lie near the anterior end just above the nerve cord on either side, but below the layer of transverse muscle (Fig. 2d). The ovovitelline ducts run laterally to the ventral nerve cords on either side (Fig. 2d–e). There are no discernible vitelline glands. The ovovitelline ducts run posterior to the gonopore, turn dorsally and unite to form a common ovovitelline duct which runs forwards (Fig. 3). It is joined by a convoluted duct (Beauchamp's canal) which runs from the large bursa. A single duct, the *canalis anonymus*, runs forwards to join the common antrum. The junction of the Beauchamp's canal with the single ovovitelline duct is close to the antrum so that the common ovovitelline duct is considerably longer than the *canalis anonymus*. Another duct (*ductus vaginalis*) leaves the bursa just behind the opening of the Beauchamp's canal and passes ventrally to open just inside the gonopore. The bursa is large and extends posteriorly for some distance.

Testes are numerous. They are ventral to and between the gut diverticula and each contains several clusters of spermatozoa (Fig. 2e). The testes commence just behind the pair of ovaries and con-

tinue to behind the pharynx almost to the copulatory apparatus (Fig. 3). The sperm duct is not discernible for most of its length, but probably runs lateral to each ventral nerve cord. A little way behind the pharyngeal region, each sperm duct becomes convoluted and expands to form a sperm storage organ (Fig. 3). These two ducts reflect upwards, forwards and then downwards to unite outside the penial musculature to form a narrow, short, single ejaculatory duct. This rapidly broadens, passes upwards, enters the penial musculature, then passes posteriorly and downwards into the penis. The penis is long and sharply conical.

Discussion. The specimens are considerably contracted longitudinally, evidenced by the anterior depression and the numerous transverse creases. It is likely that, when alive and crawling, they are at least two or three times longer than the preserved length. The longest might thus have been over 45 mm in length when alive, and probably quite thin. No more specimens have been seen since the original discovery.

The specimens are undoubtedly of the genus *Othelosoma* since they possess an anterior retractor muscle, an annular zone of parenchymal muscle and the typical bursa and dual ducts of the female copulatory apparatus. Marcus (1955a,b) provided an anatomical key to the 21 species whose copulatory apparatus was then known. The key leads to *O. notabile* (Graff, 1899). This species was from Cameroon and is dark brown with two broad

black stripes. Further, in *O. notabile* the opening of the ductus vaginalis into the bursa is anterior to that of Beauchamp's canal (Heinzel 1929) whereas in *O. jobergi* it is posterior. In *O. notabile* the ductus vaginalis opens into the antrum slightly dorsal to the opening of the canalis anonymus, whereas in *O. jobergi* it opens ventrally, only just within the gonopore. So the specimens cannot be *O. notabile*.

Further *Othelosoma* spp. were described subsequent to the key of Marcus (1955a,b). *Othelosoma marlieri* Beauchamp, 1956, is strongly patterned externally, has a genito-intestinal connection and no bursa. *Othelosoma marcusii* Beauchamp, 1956, is brown with a white median stripe, and the various female ducts have a different arrangement to *O. jobergi*. *Othelosoma evelinae* Marcus, 1970, is larger (76 mm preserved length), is grey dorsally, fading to grey ventrally, lacks an anterior retractor muscle, and has an intestinal connection to Beauchamp's canal.

In *O. joburgi*, the Beauchamp's canal joins the common ovovitelline duct quite close to the latter's opening into the common antrum. Thus the common ovovitelline duct before its junction with Beauchamp's canal is quite long, and Beauchamp's canal is about 10 times longer than the canalis anonymus (the portion of the common ovovitelline duct between Beauchamp's canal and the antrum). In most other species of *Othelosoma*, Beauchamp's canal is shorter or about the same length as the canalis anonymus. The exceptions are *O. notabile* (see above and Heinzel 1929) and *O. chinum* Marcus 1955a,b. *Othelosoma chinum* is grey anteriorly, darkening gradually towards the black, pointed tail, and the anterior retractor is ventral.

Though the only information concerning the external appearance of the specimens is the comment on the 'sick green' colour, it is apparent from the preserved specimens that there are no stripes or differential colour pattern. Even in preserved specimens, some colouration and stripes, where present, are almost always visible in land planarians even if colours change. Most species of *Othelosoma* have various longitudinal stripes, only seven species could be described as uniform or unstriped (see below). Of these, no description of colour even remotely resembles the described colour of *O. jobergi*.

One South African species of land flatworm is green, *Microplana viridis* (Jameson, 1907). This is about 12 cm long and described by Jameson as 'from grass green to olive green, except the first 3 to

5 mm of the body, which are yellowish brown with a dark brown tip on which are situated the eyes'. It is much larger than *O. jobergi* and in any case has different female copulatory ducts (Jameson 1907) and is therefore of a different genus.

Nothing is known about the feeding habits of any species of *Othelosoma*, or indeed of any other aspect of their biology. The anterior retractor muscle and the strong parenchymal musculature suggests that *Othelosoma* might feed by attaching to prey, perhaps arthropods, and rapidly retracting. For African species generally, little is known about any aspect of the biology, most papers being merely descriptive. The type of prey is known for only for one species, *Microplana termitophaga* Jones *et al.*, 1990. It feeds by crawling to the lip of open termite mounds and 'fishing' for termites. Individuals anchor by their posterior end, the anterior end attaches to a termite and the worm then contracts, pulling the termite out of the mound (Jones *et al.* 1990; Cumming 1995; Jones & Cumming 1998).

Presumably *Othelosoma* spp. reproduce as other land planarians, by copulation and development of an egg capsule which is then released.

LIST OF AFRICAN TERRESTRIAL PLANARIANS

All native African land planarian species have just two eyes and are thus of the family Rhynchodemidae. The African fauna is dominated by species of *Othelosoma* and *Microplana*. Twenty-seven of the 34 known species of *Othelosoma* are from Africa (the remainder are from India), and 50 % of the recorded African species are *Othelosoma* spp. *Othelosoma* are generally plump worms, and most possess a powerful anterior retractor muscle which causes the anterior end of preserved specimens to be strongly contracted. Marcus (1953) listed the 29 species of land planarian then known from Africa, at least one, *Bipalium kewense*, being undoubtedly introduced, and described six new species. Marcus (1955a,b) provided a useful anatomical key to the then-known species. Winsor (1998) gave advice on collection and preservation. Any unfamiliar specimens should preferably be photographed alive in colour before preservation.

Species are listed below with preserved length (unless stated live), brief external descriptions and localities. It will be necessary to consult source literature for anatomical details (where these exist, see Ogren & Kawakatsu 1988, 1989; Ogren *et al.* 1997). Country names are those in current use.

Note: D.R. Congo = Democratic Republic of Congo (formerly Zaire/Belgian Congo).

FAMILY RHYNCHODEMIDAE

Two eyes; elongate, cylindrical body with tapered anterior (no tentacles or expanded head). 48 African species.

Subfamily Rhynchodeminae

Strong subepidermal musculature with muscle fibres grouped into large, definite bundles; penis papilla absent or greatly reduced. Three African species.

Dolichoplana conradti Graff, 1899

30 mm. Yellow with three black stripes, median stripe broad, three times broader than lateral stripes. Togo.

Dolichoplana spp. are elongate, thin and flattened worms with median dorsoventral indentation. Male organ without penis papilla, antrum very large, elongate with many folds, opening into large elongate common antrum. Female short, glandular duct and vagina open dorsally into common antrum. Prominent diverticulum opens from posterior wall of common antrum near the gonopore. Eleven further species, widely distributed in South and Central America, Madagascar, and South-East Asia.

Platydemus montanus Mell, 1904

14 mm. Dark grey-brown or black. Grey ventrally, dark median line. Ethiopia (Djamdjam).

Platydemus spp. have a massive, plano-convex body, tapered at both ends. Broad creeping sole. Very large eyes. Anterior secretory and sensory tracts. Cross-section broad, flattened. Nerve cords plate-like. Male copulatory organ consists of a large chamber with folded epithelium and in most cases a short penis papilla. Vagina opens from dorsal aspect into large common antrum. Ventrally a diverticulum (or glandular sac) opens from the posterior wall of the common antrum. Thirty-four more species.

Rhynchodemus hectori (Graff, 1897) var. *marfa* Marcus, 1953.

To 22 mm. Brown, blackish grey or cream-coloured, no stripes. Sole greyish white. D.R. Congo.

Rhynchodemus spp. are elongate, attenuated at both ends, oval to round in cross-section. Creeping sole occupying most of the ventral surface. Anterior

sensory tracts present and a pair of medium-sized to large eyes, often situated on the side of the head. Mature male copulatory apparatus lacks a penis papilla, but develops large folds in the antrum. Female copulatory apparatus simple and without a genito-intestinal connection. Fifty-two more species.

Subfamily Microplaninae

Weak subepidermal longitudinal muscle fibres not in bundles; penis papilla present. Forty-five African species.

Amblyplana capensis Graff, 1899

17 mm. Brown, narrow median black line. South Africa (Cape Town).

Amblyplana ehrenbergi Graff, 1899

44 mm. Dark brown, paler brown laterally. Cameroon.

Amblyplana knysnensis Graff, 1899

19 mm. Dark rust-red (ferruginous). South Africa (Cape Town).

Amblyplana zenkeri Graff, 1899

23 mm. Black, brown at anterior end. Ventrally pale with black median line. Cameroon.

Amblyplana spp. have a plump, rounded body, two well-developed retinal eyes on subcylindrical head. Narrow sole. Well-developed bundle of parenchymal musculature and retractor muscle at anterior end which pulls the front inwards. (Ogren, in Ogren & Kawakatsu, 1988, considered this genus to be no longer valid, in which case all species would be *Othelosoma*.) Five more species.

Microplana aberana (Mell, 1904)

36 mm. Yellow-grey, black median line. Sole yellow-white. Ethiopia.

Microplana cherangani (Beauchamp, 1936).

To 40 mm. Lead-grey, thin white median line, two black bands and two white bands. Pales anteriorly to head, which is yellow. Ethiopia (Cherangani); Kenya.

Microplana harea (Marcus, 1953)

15 mm. Dark grey, fine black midline. Paler ventrally. D.R. Congo.

Microplana natalensis (Jameson, 1907)

To 50 mm (70 live). Rich chocolate-brown, paler laterally, pigment diffuse anteriorly but tip is dark (contains the eyes). Yellowish grey ventrally, sole whitish. South Africa (KwaZulu-Natal, Pietermaritzburg).

Microplana neumanni (Mell, 1904).

15 mm. Bright yellow, black-brown median stripe, two broader lateral stripes. Ethiopia (Djardjam).

Microplana purpurea (Bendl, 1908)

17.5 mm. Purple-brown with darker median stripe. Ventral pale brown laterally, sole grey, bounded by dark lines. Yellow area around pharyngeal aperture. Ethiopia.

Microplana termitophaga Jones *et al.*, 1990.

To 22 mm. Black, black midline, paler underside. Kenya, Zimbabwe, Zambia.

Microplana tetracladea (Wilczyński, 1923)

To 16 mm. Uniform dark greyish-brown, sole slightly paler. Tanzania (Mt Kilimanjaro).

Microplana viridis (Jameson, 1907)

To 100 mm (120 mm live). Grass-green to olive-green, except anterior 3–5 mm yellow-brown with dark tip (with eyes). Dirty yellow ventrally, sole whitish. South Africa (KwaZulu-Natal).

Microplana spp. have an elongate, rounded body and two small eyes. Male copulatory organs consists of well-developed penis with muscular bulbus, bulbar cavity and elongate penis papilla projecting into short antrum; female organ has one simple canal (vagina) entering the common antrum; typically a genito-intestinal duct is present, arising from the vagina or behind the common o-vitelline duct; seminal bursa can be present with a short connection to female tract, with or without connections to gut. At least 37 more species.

Othelosoma africanum (Graff, 1899)

7 mm. Yellow, three dark-brown stripes, ventrally yellow, sole white. South Africa ('Cape').

Othelosoma angolense (Beauchamp, 1951)

To 23 mm. Two lateral dark-brown bands, ivory centre with dark median line. Paler ventrally. Angola (Luachimo).

Othelosoma caffra (Jameson, 1907)

To 50 mm. Slate-brown, varying from light grey-brown to almost black. Median dorsal dark line disappears anteriorly. Paler zone anterior 5–6 mm, anterior tip dark. Pale yellowish to greyish white ventrally. South Africa ('Cape').

Othelosoma chinum Marcus, 1955a

12 mm. Grey anterior grading to black towards the pointed posterior. Grey ventrally, sole white.

South Africa (Eastern Cape Province, 40 km W Port Elizabeth).

Othelosoma conyum Marcus, 1953

To 26 mm. Rusty brown, paler laterally. Anterior darker, black median line, two lateral broader stripes. Sole white. D.R. Congo (Katongo).

Othelosoma cylindricum (Beauchamp, 1913)

20 mm. Uniformly grey, almost black. Sole yellow/white. Kenya (Mt Kenya).

Othelosoma evelinae Marcus, 1970

To 76 mm. Uniformly grey dorsally, yellowish ventrally. Sole white, narrow. South Africa (KwaZulu-Natal, Gudu Falls, Royal Natal National Park).

Othelosoma flavescens (Jameson, 1907)

To 55 mm (80 mm live). Yellow dorsally, little paler ventrally. Median dark brown line starts 6–8 mm from anterior. No dark anterior tip. Sole whitish. South Africa ('Cape').

Othelosoma flavum (Moseley, 1877)

40 mm. Light yellow, narrow jet-black median line. South Africa ('Cape')

Othelosoma fuscum (Moseley, 1877)

15 mm. Flesh coloured, pair of broad bands mottled brown, narrow median pale stripe. South Africa ('Cape')

Othelosoma gnaum Marcus, 1955a

To 30 mm. Light brown, paler ventrally, narrow black median stripe, broader lateral stripes confluent anterior of median stripe. Sole white. South Africa (Eastern Cape Province, 40 km W Port Elizabeth).

Othelosoma hepaticarum (Jameson, 1907)

To 40 mm live. Dark brown, light brown/fawn median line. Edges of brown darker, converging anteriorly and posteriorly. Ventrally with diffuse pigment. South Africa (KwaZulu-Natal).

Othelosoma huntum Marcus, 1955a

To 9 mm. Brownish yellow, three black stripes, median narrow, lateral ones broader. Sole white. South Africa ('Cape').

Othelosoma joburgi Jones, 2003

To 15 mm. Uniform 'sick-green' colour, perhaps pale creeping sole. South Africa (Gauteng province, Roodepoort).

Othelosoma macrothylax (Beauchamp, 1936)

To 32 mm. Grey-black, slightly marbled, thin white median line, two lateral lines less well-

defined. Sole limited by two black lines, each with clear band. Ethiopia (Kinangop).

Othelosoma marcus Beauchamp, 1956

To 36 mm. Brown, white median stripe. Ruanda (Nyongwe).

Othelosoma marlieri Beauchamp, 1956

To 19 mm. Brown. Three dorsal black, broad stripes visible after clearing. White collar behind anterior black tip. D.R. Congo (Kivu).

Othelosoma nigrescens (Mell, 1904)

16 mm. Black, darker anteriorly. Sole yellow-grey. Ethiopia.

Othelosoma notabile (Graff, 1899)

60 mm. Dark brown with two broad black stripes. Ventrally brown. Sole pale. (Similar pattern to *O. angolense*.) Cameroon.

Othelosoma polecatum Marcus, 1953

18 mm (at least). Dark yellow, four black stripes, median ones connected by stipple. D.R. Congo (Kabwe).

Othelosoma pugum Marcus, 1953

6.5–27 mm. Light reddish-brown fading laterally. Anterior tip light surrounded by darker brown ring from which runs a narrow median line. Two broader lateral stripes, unite at tail. Ventrally light yellow, sole paler. D.R. Congo (Mukana).

Othelosoma rudebecki Marcus, 1955a

To 15.4 mm. Brownish, paler towards ventral side, three dorsal stripes, median black, lateral ones less pigmented, broader. Sole white. South Africa (former 'Transvaal').

Othelosoma saegeri Marcus, 1955a

To 11 mm. Black dorsally, grading through grey laterally to white sole. Eyes very close to each other. D.R. Congo (Garamba).

Othelosoma speciosum Graff, 1896/99

26 mm. Body broad anteriorly. Large yellowish, ventral U-shaped sucker. Darkish brown (ferruginous) dorsally and ventrally. Sole pale. South Africa ('Cape').

Othelosoma symonds Gray, 1869

25 mm. Reddish brown, three broad black stripes. Head white. Ventrally pale. Sole white. Gabon.

Othelosoma voleum Marcus, 1953

To 50 mm. 'Mustard yellow', three sharp black equal stripes. Sole pale. Tanzania.

Othelosoma wauzen Marcus, 1955a

To 16 mm. Black dorsally, sharp limit to light grey ventrally. Sole white. Anterior flattened. South Africa ('Cape').

Othelosoma spp. generally have a rounded, plump body, anterior blunt or inrolled. Dorsal anterior parenchymal muscle well developed and may be differentiated as discrete retractor muscle. Narrow creeping sole nearly reaching anterior tip. Seminal bursa very large, communicating by two openings, or by common opening with two canals, a ductus vaginalis and a Beauchamp's canal, with the genital antrum. Twenty-seven African species (a further seven in India). Marcus (1953) commented that most African *Othelosoma* have a median dark stripe (with or without lateral stripes). Only three have a median pale line (thus two or four dark stripes) – *O. angolense* (2), *O. notabile* (2) and *O. polecatum* (4).

Rhynchodemid species of uncertain genus (due to immaturity)

Species 978 (Marcus, 1955a)

11.5 mm. Greyish yellow, black median stripe two lateral stripes broader. Yellow ventrally, sole white. No retractor (?*Microplana*). South Africa (Eastern Cape Province, Tzitzikama Forest).

Species 984 (Marcus, 1955a)

To 15 mm. Blackish grey dorsally and ventrally. Creeping sole pale. Ventral anterior retractor (?*Othelosoma*). South Africa (Eastern Cape Province, Bloukrans River, Tzitzikama Forest).

Species 991 (Marcus, 1955a)

5 mm. Greyish brown, black median line. Sole white. Powerful dorsal retractor (?*Othelosoma*). South Africa (KwaZulu-Natal, Hluhluwe).

Species 999 (Marcus, 1955a)

13 mm. Light brown ochre dorsally and ventrally. Dorsal retractor (?*Othelosoma*). South Africa (Eastern Cape Province, Tzitzikama Forest).

Species 1001 (Marcus, 1955a)

6 mm. Dark grey, narrow light creeping sole. No retractor (?*Microplana*). South Africa (Western Cape Province, Mitchell's Pass).

Family Geoplanidae

(Multiple eyes, anterior not expanded)

Pelmatoplana buettneri Graff, 1899

34 mm. Dark brown with five equal black stripes. Paling ventrally to pale sole with fine median line. Togo.

Ogren & Kawakatsu (1991) placed this species in their collective genus *Australopacifica*. It is the only geoplanid described from Africa. Since it is well outside the range of other geoplanids, it must have been introduced. It does not appear to have been recorded since the original specimens were found.

INTRODUCED SPECIES

Family Geoplanidae

Kontikia orana Froehlich, 1955

To 25 mm live. Ash-grey to pale orange with three broad stripes, median black, lateral ones brown, fused anteriorly. Uganda (Rubaga). The type locality is São Paulo, Brazil, though considered introduced even there. Also found in Townsville, Australia (Winsor 1986).

Kontikia ventrolineata (Dendy, 1892)

To 20 mm live, rounded. Black, on close inspection two narrow pale lines run either side of the midline. Five dark ventral stripes on pale background. South Africa (Johannesburg) (Jones *et al.* 1998). Also introduced to U.S.A., U.K., Hawaii and New Zealand from probable origin in Australia.

Family Bipaliidae

Bipalium kewense Moseley, 1878

To 200 mm live. Broad, semi-circular head. Buff-coloured with five purple-black stripes. South Africa (Cape Town, Johannesburg, Pietermaritzburg); Zimbabwe (Harare); St Helena; Cape Verde Islands. Worldwide distribution (Winsor 1983). Origin South-East Asia. The only species of the family Bipaliidae yet recorded from Africa, but it is possible that others might have been introduced. *Bipalium* is a dominant genus in Madagascar from where 24 species of this or closely related genera have been recorded (Ogren *et al.* 1997). Eats earthworms and may reproduce by fission.

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*The complete Index series to the land planarians (e.g. Ogren & Kawakatsu, 1988, 1989, 1991; Ogren *et al.* 1997.) is now available as a read-only CD-ROM. Contact the author for further details or e-mail enquiries to gen-yu@mtc.biglobe.ne.jp